Irritation of nerves of taste caused a diminution of the extremities and a cooling of the part. Irritation of the auditory nerves caused a diminution of temperature and of volume, The change from darkness to light, or the reverse, caused a diminution of volume of the extremities.—*St. Petersburger medicinische Wochenschrift*, 1883, No. 26.

THE RELATION OF THE DEPRESSOR NERVE TO THE VAGUS.—Messrs. Zybulsky and Wartanow have used dogs and cats in their experiments upon this subject. In dogs it can be separated from the vagus and inferior laryngeal nerves. If the central end of the depressor is irritated without section of the vagus, then there is slowing of the pulse, depression of arterial tension. After section of both vagi, then sometimes with weak currents there is a depression of blood-pressure, but usually an elevation of it. Irritation of its peripheral end caused slowing of the pulse. In cats the same results ensued.

They found that in cases where irritation of the depressor caused considerable diminution of the arterial tension, that irritation of the vagus caused an elevation; in other cases where the depressor caused elevation of arterial pressure, the vagus caused depression, so that there would seem to be a compensatory relation between the nerves. Hence in the vagus there are pressure-increasing and pressure-decreasing fibres.—*St. Petersburger medicinische Wochenschrift*, 1883, No. 25. ISAAC OTT, M.D.

b.—GENERAL PATHOLOGY OF THE NERVOUS SYSTEM.

ON CHEMICAL DISEASES OF THE BRAIN AND SPINAL CORD, AS CONDITIONED BY THE CHEMICAL CONSTITUTION OF THESE ORGANS.—Dr. J. L. W. Thudicum, London, publishes, in the *British Med. Jour.*, Sept. 15th, a paper under the above title, from which we quote certain passages.

"I submit," he says, "that locomoter ataxia is, in the first instance, an affection of white nerve matter, mainly in the spinal marrow. It consists essentially of a gradual destruction of colorless fibres, which is accompanied by the formation of microscopic bodies, having the shape of wheat-starch, and a chemical reaction with iodine, which is not that of starch, but of lignin; for starch becomes immediately blue with iodine, while these bodies require to be changed by prolonged contact with dilute sulphuric acid before they assume a blue color with iodine. These bodies were by their discoverer termed amyloid bodies, and the disease of which they were diagnostic was termed amyloid degeneration.

" Unfortunately the morbid anatomists have included under the term 'amyloid degeneration' a number of chronic parenchymatous lesions, particularly of the liver and spleen, which have nothing in common with the disease of the nerve tissues truly called amyloid. These false amyloid deposits do not give a blue reaction with iodine, however treated, but only a mahogany-brown coloration, which is not diagnostic of any well-known chemical principle. * * * You will find in works on physiological chemistry, with few exceptions, the dogmatic statement that so-called amyloid matter is not a carbo-hydrate, but an albuminous matter. This is one of the most deplorable errors, which should be rectified as soon as possible. Amyloid matter is closely related to, perhaps identical with, cellulose; it is insoluble in caustic alkali, and contains no nitrogen. It has no similarity in appearance or reaction with the exuded matter in the liver and spleen which becomes mahogany-colored with iodine. True amyloid matter may, indeed, occur in many tissues, but only sporadically, so to say, and not massively. In the latter form it occurs solely in the spinal marrow and brain. Now let us cast a glance at a class of immediate principles of the brain which I have termed *cerebrosides.* The principal one is *phrenoin;* the second in order of quantity is *kerain;* together they form about five per cent. of the brain. From the table exhibiting the chemical constitution of phrenoin, you will see that it contains the elements of a sugar—*cerebrase* ($C_6H_{12}O_6$); of a fatty acid, fusing at 84° C.—*neurostearic acid* ($C_{18}H_{36}O_2$), an isomer of the ordinary stearic acid which fuses at 69.5° C.; and of an alkaloid sphingoin ($C_{17}H_{35}NO_2$). These three products are actually obtained by the chemical change, so-called chemalysis, of phrenoin. Of phrenoin 25 per cent. belongs to the cerebrose radical, so that the brain actually contains between one and two per cent. of this carbo-hydrate.

"Amyloid matter or cellulin, commonly called cellulose, is closely related to sugar. It can be transformed into a sugar in the laboratory; but the transformation of sugar into cellulin has not yet been effected in the laboratory, although it occurs largely in plants and, perhaps, in those lower animals in the tissues of which true cellulin is met with; probably also in the crustacea and insects and arachnids which are covered by a body so closely related to cellulin that it might be called nitrogenized cellulin—namely, *chitin.* Now, it is most natural, I might say the most necessary hypothesis derived from the contemplation of the constitution of the cerebrosides, that in the course of their decomposition, which occurs along with disintegration of the white nerve fibres, the cerebrose radical is set free under circumstances which favor a withholding or a slow abstraction of water, and that thus it passes directly into its cellulin ($C_6H_{10}O_5$)—that is, *amyloid* of the nerve centre. This amyloid degeneration is a slowly progressing disease. It not rarely ascends the spinal marrow gradually, and does rarely destroy its victims in shorter periods than are measured by years.

"The peculiar constitution of the *cerebrosides* (or cerebral amyloids, or, as they may be termed, cerebrin bodies) gives the opportunity for another remarkable chemical disease of the brain

—namely, a kind of *acute glycosuria*, cerebrose diabetes. This accompanies certain injuries of the brain, and is itself always accompanied by fever. The cerebrose which is liberated by the brain and nerves may appear in the urine, but it is always small in amount. It can be isolated by precipitation with basic lead acetate, and decomposition of the precipitate. Cerebrose rotates the ray of polarized light, and reduces cupro-polassium-tartrate solution. It is thus sharply distinguished from *inosite*, which does not affect polarized light and does not reduce the alkaline copper-tartrate solution, but gives a characteristic rose-pink reaction with mercury nitrate. Inosite also occurs frequently in the urine in disease, but it is then supposed to be derived from the muscles. I have at present no evidence of inosite from the brain taking part in the inosuria, but the possibility must be borne in mind. These appearances of peculiar sugars not being the ordinary dextron or diabetic sugar, in the urine in acute stages of disease, are well illustrated by the condition termed *lactosuria*, in which the lactose or sugar of milk found in the breast, owing to the impediments to the flow of milk,—*e. g.*, by inflammation,—passes into the blood and is excreted by the kidneys. Of course it may be supposed that the other constituents of cerebrosides, which are decomposed under the influence of a morbific process—namely, neurostearic acid and sphingoin—also produce their own peculiar effects, of which those of the acid are probably mechanical—namely, deposition in a granular state, giving the microscopical appearance of fatty degeneration ; while those of the alkaloid may be potential and poisonous, interfering with the action of adjacent unchanged nerve fibres, or even influencing, by way of the blood, paramount ganglia of animal or sympathetic action.

" I now try to direct your attention for a moment to the phosphorized, nitrogenized principle of the brain. My researches have established the fact that there are at least three genera, and in one genus at least three species, of these bodies which are no less remarkable by their chemical constitution than by their physical properties. By their faculty of assuming and maintaining the colloid state, they build up, so to say, the nerve fibre and massive accumulation of fibre toward nerve centres. * * * The phosphorized substances have their unmistakable function in the physical and chemical economy of nerve matter. They are present in all nerve matter, particularly in the gray tissue ; they outweigh the cerebromides in quantity, while in the white matter the cerebromides prevail in quantity. In short, they are deposited in every centre of life-action ; in the nuclei of the ganglionic cells, no less than in those of all other cells, or bioplastic particles, blood-corpuscles included. Now, consider that these substances in the water-swelled colloid state combine with all chemical reagents with which they may be brought in contact, as long as these combinants are in relative excess, and that they part again with those with which they have combined by a simple process of dialysis ; and you have the key to the comprehension of a vast amount of brain-disease, and indeed of disease in general, not confined and perhaps not even referred to the brain. * * * If the blood bring a lead salt to the brain or nerve, kephalin and myelin immediately combine with it, the former more loosely, the latter more firmly ; lecithin, apomyelin, and anilin, on the other hand, do not combine with the lead salt. In kephalin and myelin the acid character prevails ; myelin indeed behaving as a dibasic acid ; while in lecithin, apomyelin, and anilin the alkaloidal character prevails, so that these bodies combine more easily with such alkaloidal reagents as codinic chloride and platinum chloride. From these typical reactions you may with great certainty derive hypotheses as to the bearing of these bodies with a great number of substances. Poisoning by lead is principally nerve-poisoning or poisoning of nerves. * * * We clear the body of lead by evacuants of all kinds, but for more remote parts we only use potassium iodide, this being not only a highly diffusible stimulant, but also a stimulant of liquid excretion. The medicine will act better the more liberally it is diluted with water ; then large doses of vehicles have been the cause of success in many cases in which the theory on the basis of which they were given could have inspired no confidence. Again, consider arsenical poisoning, or, what is somewhat analogous to it, poisoning by phosphorus. Arsenious and arsenic acids precipitate the phosphorized colloids of the nerves. So does phosphorus in its initial stages of oxydation, and causes death of paramount ganglion. What kills is direct chemical combination of the poison with the nerve ingredient. The most remarkable combining power is exhibited by nearly all specific nerve-principles with regard to alcohol. Chronic alcoholic intoxication is such a state of combination of alcohol with phosphorized principles and cerebromides. It is curable by disassociation, or more correctly, the washing of the alcohol out of the brain and nerves by great volumes of watery blood free from alcohol as introduced by the digestive organs. * * * It follows from the affinities of brain matter for spirit that if the spirit drunk and intended to be digested exceed a certain limit of concentration on entering the stomach, it will combine with brain matter and alter its nature and function ; the restoration to a healthy state is best effected by a prudent diuretic treatment, which, if due regard be had to the strength of the heart, which is the second factor in diuresis next to the kidneys, so to say, washes out the brain and leaves it impressionable by tonic treatment. Tonics and narcotics too often used in these cases are in my experience not admissible before the nerve tissue has been cleared of combined alcohol. The phosphorized principles give to decomposition-products in several forms of brain-lesion, but more particularly in acute and chronic so-called softening. In these cases glycerophosphoric acid is found in the softened matter, and the fatty acids form in fact an emulsion ; cholesterin is deposited in minute crystals ; when the process has lasted long the liquid, with the acids, is absorbed, and a cheesy mass remains surrounded by a cerebral cicatrix. Cholesterin, an alcohol by function, plays a much more important part in the chemistry of brain tissue than is commonly believed. * * * The large amount of cholesterin deposited in all degenerated tissue, *e. g.*, in common atheroma of arteries by the side of calcic phosphate, shows that the matters which kept it in solution, namely, the phosphorized and nitrogenized principles of nerve tissue, were decomposed and absorbed; once divorced from the bioplastic centre cholesterin remains isolated, loses the colloid state, assumes the crystalline condition, and henceforth is a dead material of no use to the economy, and perhaps dangerous, by the possibility of the increase of its particles under crystalline attraction. * * * Faulty excretion has a most disastrous influence upon the chemistry of the brain, as can be seen in all renal and all acute febrile diseases. * * * The brain is the most marvellous chemical laboratory of the animal economy; in it the albuminous, phosphorized, nitrogenized, oxygenated principles which perform functions as acids, alcohols, alkaloids, or bases, or as ethers, are brought into the most varied relations for the production of power of the most refined nature. The organic ingredients and constituents are as varied and necessary as in any other part of the body; and in some portions of the brain at least, a selective faculty causes the potash salts to prevail over the soda salts, as they do in muscle. This brings about the same contrast between the sodically alkaline blood and those parts of the brain, as exists between the blood and the muscle. The contrast is one favoring reaction."

ON THE ELECTRICAL EXCITABILITY OF THE BRAIN IN ANÆMIA.—J. Orchansky (*Arch. f. Psych.*, etc, Charkow, 1883) has studied the effects of blood-letting upon the excitability of the brain in narcotized and unnarcotized dogs by exposing and exciting the cortical motor area, for the anterior and posterior extremity, by means of the induced and constant current, and with the following results: After the abstraction of about one seventh of the total quantity of blood no effects were observed; after one fifth, increased excitability. A still greater abstraction diminished the excitability, at first slowly, then, after three fifths had been abstracted, very rapidly, falling in a few minutes to nothing. The increase as well as the diminution of the excitability does not follow the loss of blood until after an interval of ten to fifteen minutes.

In the phase of increased excitability a condition of psychical irritability was observed in unnarcotized animals, while during the period of diminished excitability the animal was quiet. The investigator thinks that these changes in excitability are not due to the mechanical or physical effects of diminished blood-pressure, but to nutritive disturbance of the brain substance.

On the theory that there exists in the cortex apparatuses for inhibition and impulsion, he believes that the increased excitability